

Canadians to a variety of substances, including pesticides. This information is provided to the PMRA for use in their ongoing human health risk assessments. Pest Management Regulatory Agency scientists work closely with HPB staff in the planning of these studies, and in other areas of research and monitoring related to pesticides and food safety.

Who makes sure that maximum residue limits are respected?

Under the FDA, the Canadian Food Inspection Agency (CFIA) is responsible for monitoring domestic and imported foods and carrying out enforcement actions to prevent the sale of food containing excessive residues.

The CFIA monitoring program from 1994 to 1998 tested 44 379 shipments of fresh and processed fruit and vegetable products. These tests showed that 98.2 percent of all domestic and imported fruit and vegetables sampled did not have residues that exceeded accepted levels. In fact, 80 percent were found to have no detectable residues at all.

If produce is determined to contain residues that exceed the established MRLs and are deemed to pose an unacceptable risk to human health, enforcement action can be taken by the CFIA that may involve removal of foods from stores, seizure of food stocks, rejection of imports and/or prosecution.

The HPB of Health Canada is responsible for auditing the food safety inspection programs carried out by the CFIA, including its pesticides enforcement and compliance activities.

Other compliance, enforcement and education activities

Under the PCPA, it is an offence to use a pesticide under unsafe conditions or to apply it other than according to label instructions. Working with provincial/territorial agriculture officials, the PMRA's regional officers monitor and investigate possible violations of the PCPA in relation to agricultural produce.

A National Standard for Pesticide Education, Training and Certification, developed in conjunction with the PMRA and administered by the provinces and territories, ensures that pesticide applicators are aware of the best agricultural practices and safety measures. Many agricultural groups also provide training and information to farmers regarding the proper use of pesticides.

What can I do to make the food I eat even safer?

It is always a good idea to wash fresh produce under running water and wipe dry. This will help remove any remaining surface pesticide residues, and more importantly, it will help to remove any dirt or bacteria that may be on the surface of the food. From the time when it is picked to the time it arrives in your kitchen, produce can come in contact with different environments and be handled by many people.

For more information about pesticides, please contact the PMRA at 1-800-267-6315, (613) 736-3799 outside of Canada, or visit our web site at www.hc-sc.gc.ca/pmra-arla.

For information concerning residue inspection, monitoring and surveillance programs, please contact the Canadian Food Inspection Agency at (613) 225-2342, or visit their web site at www.cfia-acia.agr.ca/.



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Canada

Fact Sheet on Pesticides and Food

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How do pesticides affect our food supply?

Pesticides play an important role in maintaining Canada's food supply by protecting food crops from disease and pests. However, many pesticides used on food, such as herbicides for the control of weeds, insecticides for the control of insects, and fungicides for the control of mould and fungi, are designed to manage the pests they target through toxic means. In some instances, residues of these pesticides can remain in or on the foods that have been treated.

To prevent the use of pesticides from adversely affecting our health, our environment, or the safety of our food supply, Health Canada's Pest Management Regulatory Agency (PMRA) assesses the potential health and environmental risks of pesticides before these products are allowed to be sold or used in Canada. Rigorous evaluation procedures establish the maximum safe amount of pesticide allowed to remain on food when sold to the Canadian consumer.

How are pesticides regulated in Canada?

The mandate of the PMRA is to protect human health and safety and the environment by minimizing risks associated with pest control products while enabling access to pest management tools and strategies. Pesticides imported into, sold or used in Canada are regulated under the *Pest Control Products Act* (PCPA) and Regulations. The PMRA is responsible for administering this legislation and for registering pest control products.

Pesticides are evaluated thoroughly before they can be registered by the PMRA. Manufacturers must submit very detailed scientific data to show that their product can be used safely and that it meets all of the criteria for acceptability prescribed by legislation. For pesticides that are designed for use in the production of food and feed crops (to protect against damage from insects, weeds or fungi), extensive scientific data are required, including:

- a comprehensive range of studies that thoroughly detail the toxic effects of the pesticide, including any abilities it may have to cause reproductive effects or cancer;
- information on the physical and chemical properties of the pesticide;
- information on the lowest effective amount of pesticide to be applied, the frequency and the time of application;
- plant and animal metabolism studies, i.e., how the pesticide is broken down in the body and in plants;
- the analytical methodology used to detect and analyse residues in foods and feeds; and
- studies that determine how much pesticide residue could appear on food.

Companies that want to have a product approved for use on foods must put the product through many years of testing to develop sufficient information to demonstrate the value and safety of the product.

It is the responsibility of the PMRA to determine whether a product is acceptable for use on food and feed crops and to determine acceptable pesticide residue levels. Pesticide residue levels in foods are regulated by establishing maximum residue limits (MRLs).

These are established under the authority of the *Food and Drugs Act* (FDA), and appear in the Food and Drugs Regulations.

How does the Pest Management Regulatory Agency determine what acceptable residue levels are?

Evaluation of toxicity data is important in examining the potential hazard of a pesticide. Toxicity tests in animals explore a wide spectrum of effects that may occur (e.g., birth defects, cancer, changes in fertility or ability to reproduce, neurotoxicity, harmful effects to organs such as the kidney, liver, etc.) and indicate if the pesticide can cause such effects in humans.

These studies help establish the "no observable adverse effect level," that is, the dose that produces no harmful effect in animals. To make it applicable to humans, this dose is then divided by at least two uncertainty factors:

- a 10-fold factor to account for uncertainty in extrapolating from animals to humans (i.e., interspecies); and
- a 10-fold factor to account for the variation within the human population (i.e., intraspecies).

In the United States, the 1996 *Food Quality Protection Act* (FQPA) mandates new health-based safety standards for pesticide residues in all foods, which include consideration for an additional safety factor of up to 10-fold to be applied where necessary to better protect infants and children. Canada is incorporating these FQPA safety standards in the evaluation of new

pesticides and in the re-evaluation of older ones. Above and beyond these, additional factors may be included to address uncertainties such as the severity of the hazard.

Once the uncertainty factors have been applied, the resulting dose is regarded as the acceptable daily intake (ADI) for humans for a particular pesticide. The ADI is the amount of a pesticide that toxicologists consider to be safe for humans, including infants and children, to consume each day for an entire lifetime. The acceptable dose level is at least 100 times lower than the level at which no effects were seen in test animals.

In general, the ADIs set by the PMRA are similar to those recommended by the United States Environmental Protection Agency (EPA) and the World Health Organization (WHO).

Dietary risk assessments take into account the fact that different segments of the population (i.e., infants, toddlers, children, adolescents and adults) have different eating habits. Children, for instance, consume more fruits, vegetables and juices for their body weight than do adults, and this is taken into account when determining potential daily intakes (PDI) of pesticide residues. The dietary risk assessment must show that the potential daily intake for each age group is lower than the acceptable daily intake before the PMRA will grant registration of a pesticide for use on a food or feed commodity.

Why are maximum residue limits important?

Maximum residue limits are established to ensure that the total consumption of residue from all food uses will not exceed the ADI for any particular pesticide. They are based on the maximum amount of residue that may remain in food (at the point of sale) when the pesticide has been applied according to its registered use pattern.

Maximum residue limits are established for all types of food: fruit and vegetables including juices, meat, dairy products, grains and processed foods. Depending on the pesticide and the food commodity, allowable residues can range from a fraction of a part per million to several parts per million.

Canadian MRLs apply to residues on both food produced in Canada and food imported into Canada from other countries.

Under the guidance of international organizations such as the United Nations, the PMRA cooperates with other countries in developing the standards and processes that exist worldwide for determining acceptable residue levels.

Ongoing research and monitoring

Health Canada's Health Protection Branch (HPB) conducts targeted research to ensure the continued safety of food. It undertakes national monitoring studies, including the Total Diet Program and National Human Milk Survey, which provide data on the exposure of